



**U.S. Army Research Institute
for the Behavioral and Social Sciences**

Research Report 1800

**Preliminary User Feedback of a Prototype Bradley Fighting
Vehicle M2A3/M3A3 Embedded Training System (BETS)**

**Margaret S. Salter
U.S. Army Research Institute**

**Kelly B. Rich
Auburn University
Consortium Research Fellows Program**

20030103 040

November 2002

Approved for public release; distribution is unlimited.

**U.S. Army Research Institute
for the Behavioral and Social Sciences**

A Directorate of the U.S. Total Army Personnel Command

**ZITA M. SIMUTIS
Acting Director**

Technical review by

Richard E. Christ, ARI
William C. Smith, P.M. Bradley Master Gunner

NOTICES

DISTRIBUTION: Primary distribution of this Research Report has been made by ARI. Please address correspondence concerning distribution of reports to: U.S. Army Research Institute for the Behavioral and Social Sciences, Attn: TAPC-ARI-PO, 5001 Eisenhower Ave., Alexandria, VA 22333-5600.

FINAL DISPOSITION: This Research Report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The findings in this Research Report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

REPORT DOCUMENTATION PAGE

Research Report 1800

Preliminary User Feedback of a Prototype Bradley Fighting Vehicle M2A3/M3A3 Embedded Training System (BETS)

Margaret S. Salter
U.S. Army Research Institute

Kelly B. Rich
Auburn University
Consortium Research Fellows Program

Infantry Forces Research Unit
Scott E. Graham, Chief

U.S. Army Research Institute for the Behavioral and Social Sciences
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

November 2002

Army Project Number
20465803D730

Personnel and Training
Analysis Activities

Approved for public release; distribution is unlimited.

FOREWORD

The U. S. Army Research Institute for the Behavioral and Social Sciences (ARI) Infantry Forces Research Unit at Fort Benning, GA has conducted research on the M2/M3 Bradley Fighting Vehicle (BFV) since before the vehicle was fielded in the early 1980s. For many years, the Bradley was a fixed element in the ARI work program, but as the vehicle has matured, ARI's recent Bradley research expertise has been provided to the Bradley Training and Doctrine Command Systems Manager Bradley (TSM-B) and to the 29th Infantry Regiment at Fort Benning primarily as technical advisory service (TAS).

The research reported here was conducted as TAS. The Deputy TSM-B requested that ARI perform an independent user evaluation of the prototype Bradley Embedded Training System (BETS) device developed for the A3 variant of the BFV. Although the BETS, a simulation-based gunnery trainer, had been demonstrated at trade shows to favorable acclaim, no data were heretofore available to show the potential value of this device from the user perspective. The very limited data collection reported here indicates universally positive acceptance from the potential user. Results have been briefed to the Deputy, TSM-B, and feedback provided to Bradley personnel from the Fort Benning and Fort Hood user communities.



STEPHEN L. GOLDBERG
Acting Technical Director

Preliminary User Feedback of a Prototype Bradley Fighting Vehicle M2A3/M3A3 Embedded Training System (BETS)

EXECUTIVE SUMMARY

Research Requirement:

The Office of the Training and Doctrine Command Systems Manager – Bradley (TSM-B), requested that the U. S. Army Research Institute for the Behavioral and Social Sciences (ARI) Infantry Forces Research Unit conduct a limited evaluation of a prototype embedded training device newly developed for users of the A3 version of the Bradley Fighting Vehicle. The device, the Bradley Embedded Training System (BETS), mimics the A3's stand-alone gunnery simulator, the Bradley Advanced Training System (BATS), but provides the training scenarios in the actual Bradley, using vehicle optics.

Procedure:

Data were collected both formally and informally from three groups of personnel located at Fort Benning and at Fort Hood. In the structured evaluations, 44 Bradley personnel completed demographic questionnaires and then fired two gunnery exercises using the BETS. After their experience, the ARI researcher interviewed them by asking a set of questions designed to elicit their impressions about the BETS device. The final data collection, held in conjunction with a master gunner conference, was limited to informal interviews with personnel as they exited the device.

Findings:

The intent of gathering information from a widely diverse group of personnel was easily met, and all participants were very favorable about the device. Experience levels varied from dismount element personnel who had never gunned before to very senior master gunners with nearly 20 years experience in Bradleys. All said they could see the potential offered by an embedded trainer. The most often voiced advantage to the BETS was its mobility, providing the opportunity to train more soldiers in a shorter time. The ability to cross train, and to maintain skills while deployed, was also seen as an advantage to the embedded trainer. The principal unfavorable response was about the size and temporary location of the prototype device, remedied in a final product.

Utilization of Findings:

Findings from this evaluation indicate primary areas of user satisfaction and concern, and will be used to help Bradley personnel make decisions on the future of the BETS device as an embedded trainer for the Bradley.

Preliminary User Feedback of a Prototype Bradley Fighting Vehicle M2A3/M3A3
Embedded Training System (BETS)

CONTENTS

	Page
INTRODUCTION	1
Limitations of the Bradley Advanced Training System (BATS) Device	1
Description of the Prototype Bradley Embedded Training System (BETS)	2
Purpose of this Research.....	3
METHODOLOGY	3
Phase One (Fort Benning)	4
Phase Two (Fort Hood)	5
Phase Three (Master Gunners)	6
RESULTS AND DISCUSSION	6
Demographics	7
Equipment Considerations	8
Responses to Structured Interviews	9
Additional Discussion	15
CONCLUSIONS AND RECOMMENDATIONS.....	16
REFERENCES	18
Appendix A Bradley Embedded Trainer – Experience Survey.....	A-1
Appendix B Structured Interview Questions	B-1
Appendix C Demographic Data.....	C-1

Preliminary User Feedback of a Prototype Bradley Fighting Vehicle M2A3/M3A3 Embedded Training System (BETS)

Introduction

The advent of the Bradley Fighting Vehicle (BFV) brought many changes to the battlefield. Besides its primary role as a transporter of soldiers, the Bradley brought a fully integrated weapon system: the 25mm main gun, the 7.62 coax machinegun, and the TOW missile. With the gunnery system came the need to train and sustain individual and crew gunnery skills for the Infantry and Cavalry. The early versions of the Bradley, like the tank before it, used the Conduct of Fire Trainer (COFT), a computer based gunnery simulation. A stand-alone system, the COFT simulates the Bradley turret and through computer-generated graphics, provides full gunnery practice. An instructor operator (I/O) assists in training each crew.

The newest Bradley, the A3 version, is markedly different from earlier BFVs. With the A3 model, the COFT has been replaced by the Bradley Advanced Training System (BATS). The BATS, like the vehicle, was designed by United Defense, Limited Partnership (UDLP). It is a full-scale gunnery trainer for the Bradley A3. The BATS, like the predecessor Bradley COFT, simulates the Bradley A3 turret, and graphically represents a virtual battlefield seen through the simulated vehicle's optical system. The BATS is a stand-alone trainer, housed in a climate-controlled environment, and uses an I/O to conduct training and monitor crew records.

Unlike the COFT, the BATS can be closely tailored to a unit's mission essential task list, and can be programmed to reflect the threat, weather, or geographic conditions expected by any crew. The trainer, whether the I/O, a senior I/O (SIO), master gunner or unit commander, can specify conditions and select from a wide variety of terrain databases. A further improvement in the BATS over the COFT is that the gunnery training exercises are programmable and random so the same exercise is not repeated in the same order with the same targets. Exercises are similar but not identical, and crews cannot simply learn (or memorize) the exercises. They must exhibit the correct gunner and crew coordination skills to achieve the standard.

As a gunnery trainer the BATS appears to satisfy its intent. The BATS reliably trains individual BFV gunners and Bradley commanders (BCs) in basic and advanced crew turret skills. Scenarios present simulated gunnery tables as well as providing the opportunity for precision and combat gunnery proficiency, moving Bradley personnel from initial turret manipulations to simulated Table XII gunnery. The BATS provides gunnery training opportunities to the BC and gunner of the A3 version of the Bradley.

Limitations of the Bradley Advanced Training System (BATS) Device

Currently, only 13 BATS devices have been fielded. Some are located in the institutional training environments at Fort Benning and Fort Knox. Others are found at Fort Hood, used in a unit environment as Fort Hood personnel receive their A3 Bradley

vehicles and their new equipment training (NET). Only eleven more BATS are planned within the next few years. The BATS, unlike the COFT, does not have a mobile version. It therefore lacks transportability, and soldiers in the schoolhouse and in units must go to the device for their A3 training.

Scheduling time to fire the BATS requires considerable advanced planning, and sometimes requires a unit's crew (or crews) to return to the installation well after duty hours to take their turn at gunnery training. Although BATS is generally planned to be operational for training throughout the 24 hour day, when the system is down for unexpected maintenance, a scheduled crew either does not get to train at all, or experiences less than its fully allocated time period in the trainer. Any time a system is unavailable for training, the potential population of trainees begins to complain that the trainer is "always" down, regardless of the actual proportion of down time to useable time. Dissatisfaction builds. Additionally, in a unit setting, soldiers must often come in from a field environment to use the BATS. As a result, if there are mechanical or technical problems with the device, the soldiers are inconvenienced and frustration builds. The unit must schedule an alternate period to train on the device.

Finally, and probably most importantly, the ever increasing numbers of deployments of Army units, to include mechanized infantry and cavalry units, requires that some kind of trainer be available for units to maintain their gunnery skills whether in a peacekeeping environment, or when deployed in a potentially hostile situation. Qualified crews need to sustain their gunnery skills, and new and alternate crews need to be trained. Plans were made (although not executed) to deploy the COFT to Operation Desert Shield, to sustain the skills of Bradley vehicle crews before Operation Desert Storm. Similarly, some training provision needs to be made for the crews of the A3 vehicle. With the difficulties involved in transporting stand-alone devices, an embedded trainer, one that would use the actual vehicle, would appear to be a viable option. Given the uncertainties of hostilities, and the realities of deployment, an embedded training solution to maintaining skills is a solution whose time is at hand. An embedded training device deploys with the unit.

Description of the Prototype Bradley Embedded Training System (BETS)

Some of the concerns described have been addressed by UDLP in their preliminary development of a prototype Bradley Embedded Training System (BETS). The BETS, like the BATS, is intended to train Bradley A3 personnel (individuals, crews, and units). Unlike the BATS, however, the BETS is an embedded trainer, integrated into the tactical Bradley. The BETS replicates the BATS, except that it is in the vehicle. When training is initiated, the commander and gunner use the BFV's hand stations and controls to interact with the simulated BATS environment, which is displayed in their primary sights. The vehicle powers the BETS device and BATS target generation software presents simulated targets and terrain using the vehicle's tactical code and fire control solutions. The BETS software replicates the same battlefield conditions as BATS does, using the same parameters of weather, topography, threat, ranges, etc. The images are identical to those found in the BATS, as are the scenarios. (See

Weirauch (2002), and Salter (2001) for more information on the BETS and the M2A3 BFV, respectively.)

The BETS (one only) is a prototype and has certain limitations. In its present configuration, it runs off commercially available computers that are physically housed in two boxes placed in the vehicle bustle rack. An upcoming near-term fix would reduce the size to a one-box configuration. The BATS graphics are displayed in the vehicle's sights. The display is therefore also available through the squad leader's display (SLD) in the troop compartment. Ideally, for production models, the computer functions would be taken over by computer cards inserted into the vehicle's hull processing unit, and the device would be transparent to the user. An on/off switch to enable an instant change from training mode to combat mode would be available. Only a limited number of demonstration scenarios are currently available although all BATS exercises should eventually be accessible in the BETS. Although provisions have not yet been made to capture crew performance records, UDLP states that this will be no problem in a fielded device. The BETS is a mobile BATS. (See Bernard and Alban, 2001, for further technical information on the BETS.)

Purpose of This Research

Although UDLP personnel have demonstrated the BETS device at several trade shows and public forums in the past year, no systematic assessment of feedback has been conducted. Given the many possible advantages of the BETS, an evaluation of the device by the potential user group, Bradley soldiers, was warranted. The Training and Doctrine Command (TRADOC) Systems Manager-Bradley (TSM-B) requested that the U.S. Army Research Institute (ARI) at Fort Benning conduct a limited user assessment of the embedded trainer device. This report documents two relatively formal attempts and one informal effort to elicit information from the prospective users of the Bradley embedded trainer.

Objective and Limitations. The intent of the limited user evaluation was to determine the ease with which a variety of Bradley personnel (experienced and inexperienced) could use the BETS and their overall satisfaction with the training device. It was understood in advance that the sample size would be very small, and that the device, still a single copy prototype, was not fully capable, nor in its final ruggedized configuration. It was also understood that scenarios would be limited to the two available demonstration exercises. No attempt would be made to evaluate gunnery performance; rather the entire focus was on the device and how well it met perceived needs of the user. However, ARI researchers anticipated that despite these limitations, the evaluation would provide an adequate initial indication of the possible value of the BETS as a potential training device.

Methodology

There were two formal phases and one informal phase to the BETS assessment. The evaluations were conducted by ARI personnel, under the auspices of TSM-B, and

with the collaboration of the 29th Infantry Regiment's Bradley Proprietary Office (BPO) (Fort Benning Phase) and the PM-Bradley (Fort Hood Phases). For ease of reporting, each phase will be described separately, and the final results combined as appropriate.

Phase One (Fort Benning)

Phase One of the assessment was conducted at Fort Benning, GA, on May 28-29, 2002. UDLP personnel ensured vehicle operation, and BPO personnel selected scheduled participants. Personnel from ARI designed and administered survey questionnaires and conducted post-training interviews, and conducted data analyses. (Rich and Salter, 2002, show preliminary data.)

Participants. Nineteen BFV A3 experienced personnel participated over the two-day period. During this phase, two BPO personnel alternated serving as the Bradley Commander (BC). All subjects served in the role of gunner.

Materials. An A3 Bradley, the BETS, and associated hardware and software were used for the assessment. Prior to the BETS evaluation, the participants were asked to complete a survey to provide demographic information and to document their personal BFV experience. After the scenario, a structured interview was conducted to assess soldiers' satisfaction with and ease of use of the BETS. Both the questionnaire and interview questions are found at Appendix A.

Site preparation and logistical support. Activities took place at the Collins Training Center at Fort Benning. UDLP personnel and the BPO worked jointly to arrange logistical support and to prepare the facility and the vehicle, and to install the BETS on the BFV. The site included a BFV bay and an adjacent classroom. Since the Bradley's engine was running, the vehicle was located outside of the vehicle bay. UDLP personnel were inside the bay where they had the ability to monitor the device software and hardware. The vehicle was stationary and the ramp remained in the lowered position throughout. Two ARI personnel were located inside the classroom where they administered surveys and interviews. Tables and chairs were provided for administrators, participants, and observers.

Daily schedules and procedures. On the first day, seven individual soldiers participated at 30-minute intervals. Upon arrival, the soldiers completed the ARI experience survey. Then BPO personnel took the participant to the vehicle to fire the two previously selected demonstration Combat Exercises (numbers 99998 and 99999, defensive position, moving and stationary targets, stationary own vehicle). These exercises were developed as demonstration exercises because they would provide even novice gunners a reasonable chance of success. In these exercises all five targets come up simultaneously, and, independent of time constraints, stay up until they have received mobility or catastrophic kills. Targets required AP or HE 25mm ammunition, and TOW missiles: a BMP (front view), a tracked vehicle (flank), two Hind-Ds (front) and a ZSU 23 (front). No troop targets (coax machine gun) were presented. After participants had completed the gunnery scenarios, they returned to the classroom

to answer interview questions administered by ARI personnel. On the second day, twelve more participants followed the established routine.

Phase Two (Fort Hood)

The second phase of the assessment was conducted at Fort Hood, TX, August 12-15, 2002. UDLP again ensured the operational integrity of the system and the PM-Bradley Master Gunner worked with the 2/5 Cavalry to schedule participants. As before, ARI collected participant responses and analyzed the data.

Participants. Twenty-five soldiers from Fort Hood participated. Most often they came in pairs to serve as Bradley commander and gunner. Occasionally when a soldier arrived alone, he served as the gunner and one of the UDLP personnel served as BC. Additionally, some individual soldiers chose not to participate, but to watch others firing through use of the SLD.

Materials. Materials were as in the first phase, with slight alterations to the ARI questionnaires and interview questions (Appendix B). Changes were based on results of the initial Fort Benning evaluation, and served to make both the survey and questions more useful.

Site preparation and logistical support. Phase Two occurred in the 2/5 Cavalry motor pool at Fort Hood, Texas. The UDLP and Fort Hood personnel worked jointly to arrange logistical support and to prepare the vehicle and the BETS. The vehicle and all technical equipment were located outdoors. The ARI researcher and subjects used a table and chairs set up adjacent to the vehicle, under the protection of a tarp. The area afforded some privacy. As in the initial phase, the vehicle remained powered up and the ramp remained in the lowered position throughout each day's events.

Daily schedules and procedures. Although a schedule was pre-planned, the unit had just returned from block leave, and it was immediately apparent that the "schedule" would have to be adjusted. Since the unit was preparing to go to the field the next week and was making preparations, their time was limited, and unpredictable. Accordingly, the ARI, UDLP and PM Bradley personnel stayed at the vehicle throughout the day, and crews (or sometimes individuals) appeared, to look, and to try the device. There was no formal schedule.

Generally, upon arrival, the soldiers received a preliminary briefing on the device, and then went into the turret as a commander and gunner pair. After firing the two demonstration exercises, they completed the experience survey and talked with ARI. In only a few instances were the two participants who arrived together a battle-rostered crew (a BC and his own gunner). Where one in the pair significantly outranked the other, the more junior member was asked questions first to preclude the more senior person from having undue influence over the other's responses. In most cases, however, the session was conducted for two crew members together.

Phase Three (Master Gunners)

The third, and very informal, phase of the assessment was conducted at Fort Hood, TX, September 17, 2002, in conjunction with the III Corps and Fort Hood Third Annual Master Gunner Conference. Personnel from UDLP again ensured the operation of the system, and an individual from ARI was available to conduct on-the-spot interviews. The PM-Bradley Master Gunner worked with conference attendees to ensure maximum exposure to the device.

Participants. Although their schedule was very tight, during the one day of data collection, 13 personnel from the Conference experimented with the device. In addition, the III Corps G3 was able to spend a few minutes looking at the BETS.

Materials. As before, an A3 Bradley and BETS were used, but ARI, in the interest of preserving the conference attendees' time schedules, did not gather demographics or require a formal structured interview. Basic data were gathered from informal conversations with the subjects.

Site preparation and logistical support. Phase Three took place in the parking lot outside of the Fort Hood Simulation Center. A section was cleared and a new BFV A3 vehicle was parked in the space. The UDLP and Fort Hood personnel worked jointly to arrange support and to prepare the vehicle and the BETS. The vehicle and all technical equipment were located outside.

Daily schedules and procedures. There was no schedule. Some participants arrived in pairs to serve as Bradley commander and gunner. Other participants were present alone and served as gunner while UDLP personnel served as the BC. Additionally, some other individuals did not actually participate by operating the BETS, but rather, used the SLD to observe others firing the BETS, or listened to the PM Bradley Master Gunner or UDLP personnel describe the device to the potential subjects. The ARI researcher sat in the back of the vehicle with personnel as they exited the turret or talked with them outside. As in the earlier phases, the vehicle remained powered up and the ramp was down throughout the day.

Some of these soldiers had heard of the BETS device before; those who had not were quickly briefed. The participants entered the turret to fire the two (or sometimes only one, depending on time available) exercises. Some participants were paired as BC and gunner; others worked as the gunner with UDLP or the PM Bradley master gunner as BC. After firing the exercises, participants spoke informally with ARI. In most cases, they spoke together as a pair.

Results and Discussion

The user assessment was conducted to evaluate user satisfaction with and ease of use of the BETS device. The intent was to provide a BETS opportunity for a number of Bradley personnel with varying degrees of experience, then to determine their

opinions about the device after they had actually used it. The key aspects of the demographic data are presented first, followed by a summary of the results of the structured interviews.

Demographics

The primary intent of demographic data collection was to assess the range of experience represented by the user groups. The intent was to obtain data from a diverse sample of individuals. This was definitely accomplished. A very large cross section of possible demographics was represented. There were distinct differences in the personnel from the three phases. On the whole the Fort Hood group was less experienced than the Fort Benning group, partly due to the limited time since their initial A3 training, and partly due to their overall short tenure in the Army. The Master Gunner group and the senior officers had the most experience. Full data are at Appendix C.

Time in service. Only three Fort Benning participants (16%) had six years or less time in service; Fort Hood had 15 (60%). Both groups had personnel with over 18 years of service. At Fort Benning, 84% of the participants were E5 or higher. The Fort Hood group had 64% E5 or higher and nine personnel ranked E4 and below. This group included two privates, one of whom had been in the Army barely two months and had (literally) never seen a Bradley before. Fort Benning had no officers; the first Fort Hood group included three lieutenants (less than two years time in service) and a very senior major. The master gunner group included one relatively junior major, and the remainder of the 14 participants (93%), all master gunners, were E6 and above, including one master sergeant.

Bradley A3 training. From Fort Benning, 79% of the participants reported less than a year had elapsed since they had been trained on the BFV M2A3 and all but one participant had been formally trained (through NET or individual training). The Fort Hood unit was newly out of NET. Only 2 personnel reported that they had been trained on the A3 vehicle longer than a year previously, and 4 of the 25 (16%) reported no training at all on the A3. Another 16% reluctantly admitted they had experienced "on-the-job" training only. Although demographic data were not specifically collected for the second Fort Hood phase, several of the Master Gunners said they were not trained on the A3 vehicle as their units are still using earlier versions of the BFV.

Duty position. Another difference between the groups was in self-reported job description. Among the Benning personnel, 6 (32%) described themselves as instructors, and 7 (37%) as BCs or gunners. Others said they were master gunners or I/Os. The Fort Hood sample had no instructors, and 11 (44%) BC/gunner. Two (11%) of the Benning personnel said they were part of the dismount element while 6 (24%) from Fort Hood categorized themselves in this manner. One from Fort Hood said he was a driver, and several reported their jobs simply as "operations." Also, as noted earlier, 16% of the Hood participants were officers. Three were platoon leaders, the other a staff officer. From the second group at Fort Hood, all but the major, a

simulations officer, would categorize themselves as Master Gunners. This group also had several representing National Guard units.

Training device familiarity. In the Benning group, 89% said they were familiar or very familiar with the COFT; the comparable Fort Hood number was only 42%. With respect to BATS experience, however, only 26% from Fort Benning rated themselves familiar or very familiar with the device; the Fort Hood group had 40%. From Fort Benning, 68% were COFT I/Os and 38% SIOs; 26% were BATS I/Os. From Fort Hood, 24% were COFT I/Os, 16% SIOs, and 12% BATS I/Os. Forty-two percent from Fort Benning and 16% from Fort Hood were Master Gunner certified. Although no data were collected to verify device experience from the master gunner group, it can safely be assumed that all were COFT or BATS I/Os because I/O is a master gunner course graduation requirement. Many are COFT SIOs, and probably several are both BATS and COFT I/Os, although, again, no data were collected to verify that point.

Equipment Considerations

In each of the three phases, the equipment, hardware, and software functioned reasonably well, with one temporary software malfunction for one soldier in phase one. There were a few relatively minor problems, however, which appeared to affect some soldiers' initial evaluations of the BETS. One problem involved zeroing. The sights, when zeroed for Armor Piercing (AP) rounds, would not hold the zero for High Explosive (HE). Although AP was accurately zeroed, to fire HP they had to fire short and to the right every time. This was a training distracter, mentioned by most of the soldiers in the Benning phase. It happened in the first Fort Hood phase, although it was mentioned less often. In the final phase none of the master gunners mentioned it. Whether the problem was fixed (unlikely) or whether it was the greater experience base of the master gunner group realizing the difficulties inherent in a prototype, it did not appear to be an issue to this group. Additionally, several participants in each phase noted a tendency toward jerkiness in graphics movement. When they were questioned about this, however, they said that the BATS does this also and therefore it is not embedded trainer specific.

One original concern about the BETS equipment was put to rest. The BETS devices were exposed to the summertime heat of the day at Fort Benning and Fort Hood. The daily temperatures were not recorded, but were clearly sufficiently high that if the equipment were to be impacted upon by the heat, performance degradations would have been apparent. None were noted.

Additionally, as noted earlier, there were only two exercises available and used, and no crew records maintained or demonstrated. The exercises were atypical in that all targets were exposed at the same time, and stayed up until killed. The UDLP personnel on site stated that all BATS exercises, as they appear in BATS, can eventually be portrayed in the BETS. They also stated that individual crew records can be generated, and that records can be passed seamlessly from the BATS to the BETS and back. These capabilities have not been seen, although since UDLP produces both

the BATS and the BETS devices, it would seem likely that the statements are valid, given adequate time and resources.

Responses to Structured Interviews

Personnel were asked a series of questions (see Appendix B) to elicit feedback about the system, ease of use of the system, and their impressions as to the potential training value of the embedded trainer device. An ARI representative who was present throughout all phases of the evaluation conducted the interviews. Sometimes the question was asked in a form to require a yes or no answer. Most frequently, those who did not concur with a statement did not actually disagree; they merely had no opinion, or did not know the answer. This was particularly true in the Fort Hood sample where many of the soldiers were extremely inexperienced. Some soldiers admitted that they had never been asked how they felt about a piece of equipment before, and they were simply not prepared to answer.

Although the interviewer guided the questions, the participants were encouraged to speak openly without constraint. Many volunteered information, anticipating the interviewer's inquiries. They appeared to feel comfortable throughout the procedure and frequently asked questions or offered unsolicited comments. In general, the participants indicated that they were impressed by, and enthusiastically in favor of the potential benefits of the BETS device. During all phases of the assessment, participants responded positively. Soldier comments are divided into nine interview topic areas, followed by a general discussion of the results. If appropriate, Fort Benning and Fort Hood groups are distinguished by their locations; the second group of participants from Fort Hood is referred to as the master gunners.

The best features of the BETS. The first interviewer- posed question asked: "What were the best features of the Bradley Embedded Trainer?" The respondents were permitted to make as many (or few) comments as they wished. Some offered only one or two ideas; others described many. Training device accessibility was the most often mentioned answer to this first question. From the Fort Benning respondents, 53% mentioned that the convenience and mobility provided by the on-vehicle location of the device would enhance Bradley training considerably; 88% of the Fort Hood participants also cited this feature immediately. The master gunners also commented on mobility (you can take it with you) as the best feature.

Much of the advantage was attributed to the fact that the device can go to the field with the unit, or can be used in the motor pool, or in any temporary or permanent assembly area. The unit is not dependent on a trainer or training device at a fixed location, and personnel do not need to leave the field to come back to main post for training. Training can be scheduled at any time, with only minimum advance planning, and the unit trainer can control his own training schedules, without being dependent on other personnel from outside the unit. Several respondents, primarily from Fort Hood and the master gunners, also commented that with the BETS, each crew would receive considerably more training than is possible now with the BATS. The National

Guardsmen at the Master Gunner Conference echoed this comment. They stated that an embedded trainer for any Guard unit would be of immense benefit and training value, not because of its convenience, but also for increased throughput.

The realism provided through exposure to the turret and the vehicle's controls was also commented on by 26% from Fort Benning and 36% from Fort Hood. Several personnel commented that they could feel the vibrations of the turret as it rotated. Several referred to the BETS as "hands on training, using your own equipment." They liked the idea of sitting in "my own seat" using "my own hand station." Training with the BETS was different from being in the BATS, and provided a good enhancement to realism in training. The Fort Hood group, familiar with conditions in the BATS, also stressed the advantages of the real world environment in their responses. They said that training should be conducted where the temperature is uncomfortably warm, where the vehicle is dirty or dusty and the ambient noise is of other vehicles, not the hum of air conditioning. Several suggested that regardless of its fidelity, BATS maintains a simulator atmosphere, and that knowledge is always in the background, which prevents total immersion in the training. Being in the real vehicle would seem to alleviate some of this training distraction. Some other favorable comments were made about the quality and realism of the graphics (Fort Benning, 32%, and Fort Hood, 24%), more a reflection of the realism provided by the BATS package than on the BETS itself. The Fort Hood group (28%) also mentioned that the BETS would enhance crew coordination, especially realistic fire commands, because they could practice more often. Although no one from Fort Benning mentioned this in response to the first question, they did so later.

Shortfalls of the BETS. The second question in the structured interviews asked about potential drawbacks to the device. All responses by Fort Benning personnel to this question and many of the Fort Hood responses were related to specific technical difficulties. Forty-seven percent of Fort Benning participants and 28% from Fort Hood had problems with the zero on the 25mm gun (would not hold for both types of ammunition). Both groups reported an unrealistic delay in switching from low magnification to high magnification (26% at Fort Benning and 12% at Fort Hood). Personnel from Fort Hood (36%), reported graphics problems (jumpy, "twitchy," shaky, or delayed presentations) as did Fort Benning (26%), although most individuals said this was also characteristic of the BATS trainer. Additionally, 21% from Fort Benning commented that the realism of the training was degraded because there was no sound. On-site UDLP personnel activated the sound switch before the Fort Hood trials. Some requested that the sound be improved. Most noticeable among these was the driver who said the sound was not quite right, but since he had not been in the gunner's position before, he was not sure what the sound was supposed to be like.

One other comment area was not really a shortfall, but was, for these soldiers, at least a temporary drawback. Many were not familiar with the concept of prototype, and could not believe that a final training version could be sufficiently ruggedized to be useable. Several mentioned that they were afraid it would break if installed. One said he did not want it at all because he was afraid he might have to pay for it if it broke.

When told that it would be no more fragile than the turret, he was reassured. He later indicated, as did some others, that his hesitation was based on the frequent downtime in the BATS.

The only other unfavorable comments focused on the size and location of the prototype. Several asked for assurance that a final product would not cause them to lose storage space in the bustle rack, or ammunition stowage space in the troop compartment. They also said that having to spend time putting the device on and then taking it off again would devalue its use, even in the motor pool. The total ease of use was a large concern.

Potential uses for BETS. The next set of interview questions asked about ways to use BETS – locations and purposes. Reiterating many earlier comments, all personnel from both installations, and the master gunner group concurred that they would use the BETS during home station training. From Fort Benning 78% said the primary value would be that training could occur in any location (including a field environment), and scheduling would be easier. They said that the device could be used for familiarization training (26%), for sustainment (16%) or training for certification (16%). From Fort Hood, they said that they would use the BETS as part of their unit's home station training because it would be convenient for location and scheduling (32%), because it would help train entire crews (12%), and because it would provide training in a natural, realistic environment (8%).

Some comments during each phase focused on the flexibility of training an individual or a crewmember, and in use of the BETS as a cross training device, or to orient a new person to the vehicle. The value of this latter use was shown at Fort Hood where the experienced driver became a novice gunner. One individual specifically cited training a new commander as a potentially very valuable use of the BETS, because of the difficulty in scheduling the commander's time at the BATS.

Another primary use for the BETS device was to enhance crew coordination, specifically mentioned by 16% of the respondents from Fort Benning and 22% from Fort Hood. Members of both groups also saw value in using the BETS to train for Table VIII and preliminary gunnery tables. At Fort Benning, 84% agreed without hesitation that it would be valuable, while all 24 participants at Fort Hood who responded to the question agreed (the new soldier said he did not know what Table VIII was). Several at each location, including the master gunners, said that if four BETS were linked, they could train up for Table XII. Several specifically mentioned using the BETS to train during sergeants' time, or in preparation for Combat Training Center rotations. One very senior trainer referred to the BETS as "the TADSS [training aids, devices, simulators and simulations] system we don't have." He suggested that having a BETS device "would be like Christmas."

Training environments. When asked if they would use the BETS training device in institutional training, 76% of Fort Hood soldiers replied that they would, because it would provide more training (16%), because it would be on board the vehicle (12%),

and because it would enhance crew coordination training (8%). One respondent from Fort Hood suggested that he would use the device to sustain school personnel training (train the trainer). When asked how they would use the device in institutional training, in the school environment, 47% of Fort Benning respondents said they would use it similarly to the way other training systems are used (the BATS or COFT, for familiarization) or in conjunction with other training systems.

Most respondents (95% from Fort Benning, 92% from Fort Hood) agreed that the device would enhance combat readiness for deployed units (the others did not know). Forty-seven percent from Fort Benning and 24% from Fort Hood suggested that combat readiness for deployed units would be enhanced because of the added training, rehearsal opportunity, and confidence the BETS could provide. Most Fort Hood and Fort Benning personnel (84% each location) agreed that the device could be used during a peacekeeping mission. The most common use during such a mission was stated to be to maintain or enhance skills and to sustain previous training. Those few who did not agree did not disagree; they just had no opinion or said they did not know. One said that his unit took the Mobile COFT to Bosnia. The training was adequate but the logistics of moving the device were poor. He thought BETS would be better.

However, only about half of each group of respondents thought that the system could or should be used in a hostile theater. They said that they felt it would provide positive benefits to training, rehearsal, or preparation, but members of both groups (11% to 12%) expressed concern that there would be too little time available during hostile missions to train on the device. Some stated that personnel ought to be fully trained before deployment (11% of Fort Benning participants and 8% from Fort Hood). However, none of the Fort Hood participants, and only one from Fort Benning, had served in Desert Storm, and they seemed unaware of the training time that was available in the build up before Desert Storm. The few with experiences in other environments had only limited time in Kosovo or Kuwait.

Use for mission rehearsal. Several of the personnel questioned agreed that a unit commander could use the BETS during mission planning, mission rehearsal, and unit maneuvers but this was a question that many personnel did not/could not answer. This appeared to be due to the relative inexperience of some respondents, and to the nature of the jobs of some of the more experienced instructors. They were simply not used to thinking tactically. Scattered comments from the Fort Benning group suggested a use in Table XII, and some suggested BETS might be used like SIMNET (Simulations Networking) or the Close Combat Tactical Trainer (CCTT). The Fort Hood group was even less specific, with the exception of the officers. All four of them agreed that the commander could potentially use the device for rehearsals, especially if the driver, gunner, and commander were linked or if the platoon was linked as an entity. They also said that the availability of different scenarios could aid mission planning and rehearsal and unit training. The simulations officer from Fort Hood appeared to be equally enthusiastic about this potential capability.

Use of BETS in conjunction with or instead of the BATS. Thirty-seven percent of Fort Benning participants and 40% of Fort Hood participants reported that they would use both devices to train. They perceived the benefit of having devices located in two different places and they indicated that both the amount and speed of training would increase, as more devices were available. The devices were also seen as contingency back ups, to provide redundancy in case of problems. Some commented that if a vehicle were down, the BETS also would be down, so the BATS could be a back up. Several personnel suggested that initial familiarization and turret manipulation training should remain on the BATS with a fully attending I/O to help a crew learn correct procedures; the BETS could be used more for sustainment, with a return to the BATS in case of performance problems. A few respondents indicated without hesitation that BATS would be the device of choice in garrison, and BETS in the field.

Respondents from Fort Hood more frequently suggested that the BETS could (or should) replace the BATS than did respondents from Fort Benning (44% and 16%, respectively). Most of this response appears to have to do with system reliability and availability for training time. The Fort Hood soldiers were very vocal in their criticism of the BATS. The Fort Hood sample perceived that the BATS was "down" too often, and should therefore be replaced. The ARI interviewer probed this question more deeply. Even if they personally were not the one inconvenienced by a "down" system, they said their soldiers were, and this made them unhappy. Additionally, if the BATS is down, the news spreads rapidly, leading to the probably false impression that the BATS is "always" down. To the extent that perception is reality, the BATS suffers from its failures, however intermittent or limited. One soldier summed up his opinion of BATS and BETS: "BATS is a pain but it works. This is like BATS but it is not a pain."

Potential basis of issue. Both groups were asked how many BETS should be purchased if the device were added to the inventory. Some few respondents responded "at least one per company," and indicated that they doubted that very many would be made available, and that one per company was better than one per battalion like the BATS. Many more respondents (63% at Fort Benning and 44% at Fort Hood) said that there should be a minimum of one or two devices per platoon and 21% from Fort Benning and 32% from Fort Hood asked that there be one device per vehicle. When questioned, some of those who said two per platoon agreed that one per vehicle would be best, but doubted that the Army could/would afford that expense. (Several said they wanted "two per platoon, as long as one is on my vehicle.") A few individuals doubted the system would ever get small enough to be located other than in the bustle rack, and they did not want to give up space in more than one vehicle. Master gunners suggested one per vehicle, but doubted that it would happen.

Features to be added to the BETS. Participants were asked what features should be added to the BETS to enhance its training value. Since the Fort Benning group had no gun sound, many requested that sound be added to the device. Although individuals at Fort Hood did have sound effects, 20% requested that it be improved. Each group said that the driver should be integrated into the system. The officers, and the Fort Hood master gunners, were especially quick to comment on the driver, and the

need to include all vehicle personnel in training. Fort Hood respondents, especially the officers, mentioned that they would like to see multiple Bradleys linked together via the BETS, for tactical rehearsals, and for Table XII. Almost all of the Master Gunner group requested this capability.

Both Fort Benning (26%) and Fort Hood (8%) participants reported that they would like to see playback or feedback features actually added to the device. Some suggested that such a feature should be through the SLD (where the training scenarios are already available). Others from Fort Hood (especially the master gunners) said that frequently the SLD is not available, and they would anticipate the need for some other method of video playback.

The I/O and record keeping. Another question concerned the need for an I/O as a training evaluator with the embedded trainer. Predecessor gunnery and tactical training devices tend to require considerable numbers of support personnel to accomplish the training as well as the facilities in which to conduct it. For gunnery devices like the COFT and the BATS, the system records and prints crew records, but an I/O is required to assist in the operation of the device, and in the interpretation of the crew-generated information. The question about I/Os provided a mixed set of answers, and many of the more experienced personnel admitted that they could argue the answer either way. Most respondents, if they had an opinion at all, had not thought about this question before, and their answers were vague and sometimes internally inconsistent.

The groups were very likely to start their responses with comments on the need to have some ability to record and report crew data, and some ability to transfer records freely back and forth from the BATS to the BETS. More Fort Benning respondents than Fort Hood respondents felt that an I/O might not be needed if the BETS could generate crew records automatically (79% and 24%, respectively). The reason for this difference is unknown except to suggest that because the Benning personnel tended to be instructors or on the NET Team, they are less likely to think of the BETS in terms of a sustainment trainer, but more for familiarization, the way they use it in the institutional environment.

However, when the issue was probed further, 21% of Fort Benning respondents also replied that an I/O might be needed to provide a unique (external) perspective and to identify and correct errors. Twenty eight percent of the Fort Hood respondents replied that someone apart from the crew (but not necessarily an I/O) would be needed to teach and give feedback to the gunner and BC and 12% of the Fort Hood soldiers admitted that the need to have an I/O would be dependent on factors such as crew and BC proficiency.

Most participants seemed confident that an I/O did not need to watch all training, but that someone might go from vehicle to vehicle and watch some aspects of training, or watch a struggling crew, from the SLD in the troop compartment. Several also suggested that the I/O (at the BATS, or monitoring the BETS) would be used for initial

training of crews, and for those who were having difficulty achieving the standard, while others could progress through using the BETS device. The master gunner group was mixed in opinions on this issue. Many admittedly do not like to serve as an I/O; they said they would like to have someone (else) perform these duties. Others said that much as they currently look at BATS crew records, they would want to look at BETS crew records as well. Several of the more experienced personnel from this group suggested that an I/O, or minimally someone outside the company chain of command, was needed to ensure integrity of the training. They expressed a fear that training limited to the individual vehicle could "get out of hand," or trainers who were not proficient would permit soldiers to learn and sustain bad habits.

The overall consensus appeared to be that although a formally trained I/O did not need to be present while training was occurring, someone outside the crew, and probably outside platoon level, still needed to look at crew records. The question becomes whether this should be the BATS I/O since both systems would generate the same data (possible if the two systems are capable of being interlinked), or whether the platoon master gunner is sufficiently competent to be the sole critic of crew performance. Some thought that unit commanders could assume the I/O role; others were equally adamant that the commander could not, but that the platoon master gunner could and should be in charge. Others argued for the company level master gunner.

Additional Discussion

Although the comments on the BETS were overwhelmingly positive, there were a few cautions offered by the soldiers. First among these was that the prototype, currently in two boxes in the bustle rack, is too big for practical use. Even the one box solution, readily available, would not be a final preference. Several soldiers expressed the fear that the device, even if ruggedized, could or would be hurt by being exposed to vehicle movement, or by exposure to variable weather conditions. They do not want the BETS to take up ammunition storage space but they do need to be able to take it in a fully combat loaded vehicle. They said it would be counterproductive to have the BETS become like many other devices, signed for and then drawn like other training aids. One experienced individual suggested that a vehicle with the BETS is ready for training; but once the BETS has been removed, the likelihood of its ever being replaced is small. The soldiers were unanimous in stating that the final form must be something transparent to the user, something truly embedded.

Participants at both locations had questions about the device's reliability. Despite the good performance demonstrated by the prototype, reliability was a great concern to experienced personnel. They also wondered if a vehicle could or would be deadlined (not available for use) if its device were broken or otherwise unavailable. This option was clearly unacceptable.

Another major concern was over the ability to switch from training (BETS device) mode to a combat mode, and the elapsed time necessary to go from one mode to

another. In the prototype version, the vehicle system must be powered down and rebooted to go from BETS to normal use. This time lag (up to 15 minutes presently) is clearly unacceptable for anything other than home station motor pool training. Some others also expressed concern about ensuring a fail-safe operation lest the training mode be accidentally turned on instead of the combat mode.

Still to be resolved, pending more work on the BETS, are further demonstrations of the crew record keeping potential, and the seamless transfer of records between the BATS and the BETS. Given the fact that many senior personnel are, as they move into that position, coming from units without A3s, some master gunners may have had only limited experience with the A3 vehicle when they get to their units. Someone like the BATS I/O would therefore be needed to assist the master gunner in interpreting crew records. Some combination of the traditional I/O and the platoon master gunner would be responsible for crew training. If the BATS and the BETS are truly interchangeable, and the records transportable from one device to another, the I/O can help the master gunner identify crew weaknesses and strengths, and make suggestions as to areas in need of work and the master gunner can easily assist a BC or gunner in training new personnel. Some suggested that the developers should also come up with exercises outside the gunnery matrix to permit the crews to work together, off the recorded matrix, for practice or sustainment.

A few very experienced master gunners mentioned another advantage to the BETS. With the recent advent of the consolidated 11B military occupational specialty (MOS) designator, and the virtual elimination of the 11M Bradley specific MOS, more and more personnel will be entering Bradley units without being specifically trained on the Bradley. Any Bradley training will be very limited before the soldier gets to the unit, regardless of potential position or rank. On the job, on site training, would be greatly enhanced by the on-board training device.

Finally, the Bradley trained personnel asked for assurance that in production models, BETS would have the driver at least minimally incorporated, to be able to move the vehicle in or out of berms on command, and to assist in target location and round count. They requested that BETS link platoon size elements, so that a commander would be able to have minimally four vehicles work together to perform potential mechanized infantry-like operations. They want a trainer that will truly let them practice for their real world mission. Several commented that the closest device to this is the CCTT where platoon and higher size elements can work together. However, to some, the CCTT is "a big video game," and without the parameters of a true gunnery trainer, cannot enable Bradley crews to maintain their skills.

Conclusions and Recommendations

As one of the Bradley personnel who participated in the very limited assessment of the Bradley Embedded Trainer said, "What's not to like?" Often, especially in the master gunner group, the respondents did not even wait to be asked. They came out of the turret saying: "I'm sold." Some participants talked on and on in their enthusiasm. All

of the surveyed personnel, nearly 60 in number, and of widely varying backgrounds, commented favorably about the embedded training device. They considered it a low overhead, convenient sustainment training device, one that would train more people in less time. The own-vehicle configuration, providing hands-on training, on demand, at any location, clearly had appeal.

There are some unresolved issues. It is incumbent on the developer to show record keeping capabilities, and that all the BATS exercises will transfer to the BETS. The BETS size and location problems must be resolved; obviously a computer interface would be ideal. The question of who will monitor BETS training, whether a BATS I/O, a master gunner or commander, or some combination, is a question that will remain unresolved until the device is closer to being fielded, and its final capabilities known. Some of the potential utility of the device is also dependent on the ability to incorporate the driver, and to link vehicles. These capabilities must be shown.

The potential impact of a BETS device on the overall Bradley program and on system requirements is unknown, as are the resources required to effect the implementation of such an embedded trainer. However, it is clear that from the user standpoint, the promised system capabilities, the ease of use and potential impact on training are high. The benefits of such a trainer would seem to outweigh disadvantages, and the BETS would appear to be a positive step forward in Bradley training. One master gunner commented that with the "instant training system" provided by BETS they would for the first time ever, "truly have a year round gunnery program."

References

Bernard, R. J., & Alban, A. M. (2001, May 30). Embedded training solution for the Bradley Fighting Vehicle (BFV) A3 (Briefing Slides). Orlando, FL: United Defense, L.P.

Rich, K. B., and Salter, M. S. (2002). Bradley M2/M3 A3 Embedded Training System (BETS): Initial user assessment. (ARI RN 02-15). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Salter, M. S. (2001). Bradley Fighting Vehicle M2/M3 A3: Training and soldier system observations. (ARI RN 01-06). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Weirauch, C. (2002, May). US armor training embraces embedded systems. *MS&T Magazine (The International Defence Training Journal)*, Issue 5/2002, 25-27

Appendix A

Bradley Embedded Trainer – Experience Survey (Fort Benning)

PLEASE ANSWER EVERY QUESTION. Fill in the blank or circle the correct response.

1. Name:
2. Are you Active Duty or National Guard or Civilian
If military, rank _____ MOS/branch _____ If civilian, last rank _____ MOS/branch _____
3. Time in service (years/months) _____
4. Current job/office/duty position (be specific) _____ How long? _____
5. Indicate your experience with each of the listed devices. Use the following scale:
1 = None 2 = Very little 3 = Some 4 = Much 5 = Very much
Conduct of Fire Trainer (COFT) _____ Simulation Networking (SIMNET) _____
Close Combat Tactical Trainer (CCTT) _____ Precision Gunnery System (PGS) _____
Bradley Advanced Training System (BATS) _____ Bradley Desktop Trainer (BDT) _____
6. Have you taken the Bradley Leader Course? Yes or No Bradley Master Gunner Course? Yes or No
7. Are you COFT I/O certified? Yes or No Are you BATS I/O certified? Yes or No
8. Are you an SIO? Yes or No If yes, which device? _____
9. Have you ever used the Bradley Embedded Trainer before today? Yes or No
If yes, please describe when and where and for what purpose _____

10. When was your last Table VIII (month/year) _____ What was your score? _____
What was your duty position? BC or Gunner or Driver Have you fired a Table XII? Yes or No
11. How many rotations have you participated in at the NTC _____ JRTC _____ CMTC _____
12. Did you serve in a crew position (Gunner/BC) during Desert Storm? Yes or No
Bosnia? Yes or No Somalia? Yes or No Another hostile environment? (be specific) _____
13. Rate your computer skills: Below Average or Average or Above Average or Much Above Average
14. Please describe your M2A3 Experience and Training. *Continue on the back of the paper if needed.*

Date of training (approx month/year) _____

Location(s) (FT Hood, FT Benning, FT Knox, etc.) _____

Trained by UD NET Team or Bradley (29th IN REG) NET Team or in a School Environment

Duty position in the M2A3 (all that apply) BC Gunner Driver Squad Member

Are you: a vehicle operator, a trainer, a commander in a unit that has A3s, a member of the NET Team?
Please describe.

Bradley Embedded Trainer – Experience Survey
(Fort Hood)

PLEASE ANSWER EVERY QUESTION. Fill in the blank or circle the correct response.

1. Name: _____
2. Rank _____ MOS/branch _____
3. Time in service (years/months) _____
4. Current job/duty position (be specific) _____ How long in this position? _____

5. Indicate your experience with each of the listed devices. Use the following scale:
1 = None 2 = Very little 3 = Some 4 = Much 5 = Very much

Conduct of Fire Trainer (COFT) _____ Simulation Networking (SIMNET) _____
Close Combat Tactical Trainer (CCTT) _____ Precision Gunnery System (PGS) _____
Bradley Advanced Training System (BATS) _____ Bradley Desktop Trainer (BDT) _____

6. Have you taken the Bradley Leader Course? Yes or No
7. Have you taken the Bradley Master Gunner Course? Yes or No
8. Are you COFT I/O certified? Yes or No
9. Are you BATS I/O certified? Yes or No
10. Are you an SIO? Yes or No If yes, which device? _____
11. Have you ever used the Bradley Embedded Trainer before today? Yes or No
If yes, please describe when and where and for what purpose _____

12. When was your last Table VIII (month/year) _____ What was your score? _____

What was your duty position? BC or Gunner or Driver Have you fired a Table XII? Yes or No

13. How many rotations have you participated in at the NTC _____ JRTC _____ CMTC _____

14. Have you served in a crew position (Gunner/BC) in a during Desert Storm? Yes or No

Bosnia? Somalia? Kosovo? Another hostile environment? (be specific) _____

13. Please describe your M2A3 Training.

Date of training (approx month/year) _____

Location(s) (FT Hood, FT Benning, FT Knox, etc.) _____

Appendix B

Structured Interview Questions (Fort Benning)

1. What were the best features of the Bradley Embedded Trainer?
2. What were the major shortfalls of the Bradley Embedded Trainer?
3. How would this device provide added training value to an individual or crew or unit?
4. How would you utilize this device as a part of your unit's home station training?
5. How might you use the BET in conjunction with the BATS?
6. Would this be a good Table VIII gunnery training device? YES or NO. Why?
7. Could you perform the full engagement sequence with the primary sight? YES or NO. Why?
8. If evaluation is done automatically (by the device), is an I/O needed to conduct crew training? YES or NO. Why?
9. Would this device enhance combat readiness when deployed CONUS/OCONUS?
10. With the exception of the BGST, can the Embedded Trainer train the primary critical skills needed for gunnery and during combat?
11. How could you use this device in institutional training? In a hostile theatre? In a peacekeeping mission?
12. How could the Embedded Trainer support a unit commander during mission planning, mission rehearsal (actions on the objective), and unit maneuvers?
13. What features would you like to see added to the Embedded Trainer?
14. What else would you like to say about the Embedded Trainer device?
15. What do you think the BOIP should be for a BET?
16. Would you buy it?
17. Can it/should it replace the BATS?

Structured Interview Questions

(Fort Hood)

Please write in your answers and circle YES or NO as appropriate. Please explain your answers to help us understand why you answered the way you did.

1. What were the best features of the Bradley Embedded Trainer?
2. What were the shortfalls of the Bradley Embedded Trainer?
3. Would you use this device as a part of your unit's home station training?
YES or NO Please *explain your answer.*
4. How could the Embedded Trainer increase the amount of time that an individual or crew spends training critical combat skills? Would you use this device in conjunction with the BATS?
YES or NO Please *explain your answer.*
5. Would this be a good device to use to train up for Table VIII?
YES or NO Please *explain your answer.*
6. If the system could generate crew records (like the COFT and BATS), would you still need an I/O?
YES or NO Please *explain your answer.*
7. Would this device enhance combat readiness for deployed units?
YES or NO Please *explain your answer.*
8. Would you use this device in institutional training?
YES or NO Please *explain your answer.*
9. Would you use this device in a hostile theatre?
YES or NO Please *explain your answer.*
10. Would you use this device during a peacekeeping mission?
YES or NO Please *explain your answer.*
11. Could a unit commander use this device during mission planning, mission rehearsal (actions on the objective), and unit maneuvers?
YES or NO Please *explain your answer.*
12. If it were added to the inventory, what should the basis of issue be? (Circle one)
1 per BN or 1 per CO or 1 per PLT or 1 per vehicle
13. Could it/should it replace the BATS?
YES or NO Please *explain your answer.*
14. What features would you like to see added to the Embedded Trainer?
15. Is there anything else you would like to say about the Embedded Trainer device?

Appendix C

Demographic Data Fort Benning (N = 19) and Fort Hood (N = 25)

Table 1
Ranks of Participants (Percentages)

Rank	Benning	Hood
<E3	0	8
E4	16	28
E5	26	20
E6	53	24
E7	5	4
Officers	0	16

Table 2
Time in Service (Percentages)

Years	Benning	Hood
<2	5	20
3-4	0	28
5-6	11	12
7-8	16	8
9-10	11	14
11-12	21	4
13-14	11	4
15-16	0	8
17-18	11	4
>19	16	8

Table 3
Experience in Hostile Theatres (Percentage Who Responded YES)

Area	Benning	Hood
Desert Storm	5	0
Bosnia	16	16
Kuwait	11	16
Kosovo	5	4

Table 4
Participant Job Titles (Percentages)

Job Description	Benning	Hood
Instructors	32	0
BC/Gunner	37	44
Dismount Element	11	24
Master Gunner	11	4
Operations	11	12
Officer	0	16

Table 5
Self-Reported Experience with Bradley Training Devices (Percentages)

		None	Very Little	Some	Much	Very Much
COFT Conduct of Fire Trainer	Benning	5.3	15.8	0.0	31.6	47.4
	Hood	24.0	8.0	20.0	12.0	36.0
CCTT Close Combat Tactical Trainer	Benning	10.5	31.6	26.3	21.1	10.5
	Hood	28.0	12.0	32.0	12.0	16.0
BATS Bradley Advanced Training System	Benning	10.5	15.8	47.4	26.3	0.0
	Hood	16.0	8.0	36.0	20.0	20.0
SIMNET Simulation Networking	Benning	10.5	26.3	26.3	36.8	0.0
	Hood	64.0	0.0	16.0	8.0	12.0
PGS Precision Gunnery System	Benning	0.0	15.8	36.8	21.10	26.3
	Hood	16.0	8.0	20.0	44.0	12.0
BDT Bradley Desktop Trainer	Benning	57.9	10.5	10.5	15.8	5.3
	Hood	64.0	12.0	12.0	4.0	8.0

Table 6
Courses and Certification (Percentage Who Responded YES)

Course	Benning	Hood
Bradley Leader Course	5.3	16.0
Bradley Master Gunner	42.1	16.0
COFT I/O	68.4	24.0
BATS I/O	26.3	12.0
COFT SIO	37.8	16.0
BATS & COFT SIO	5.3	0.0

Table 7
Combat Training Center Experience (Number of Rotations) (Percentages)

	None	1-4	>4
National Training Center			
Benning	21	47	32
Hood	44	44	12
Joint Readiness Training Center			
Benning	68	32	0
Hood	80	20	0
Combat Maneuver Training Center			
Benning	37	47	16
Hood	76	12	12